3.17 Transformations: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

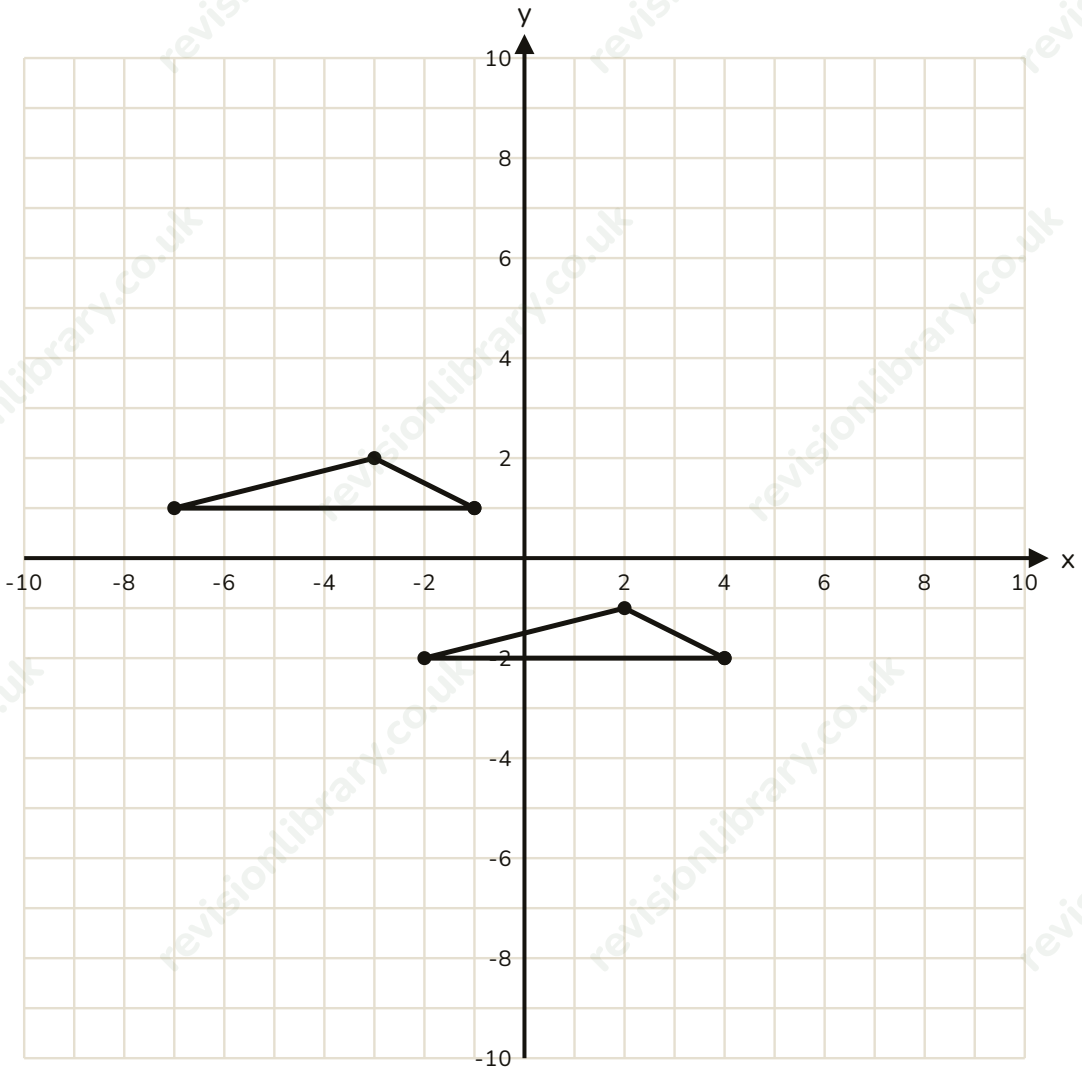
1 Point P has coordinates (-3, 0). P is enlarged with scale factor 3 and centre (-2, -3).
Write down the coordinates of the image of P.

(Total for Question 1 is 3 marks)

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2 Triangle T has vertices at (4, -2), (2, -1), (-2, -2). Triangle U has vertices at (-1, 1), (-3, 2), (-7, 1).

Describe fully the single transformation that maps T onto U.



(Total for Question 2 is 3 marks)

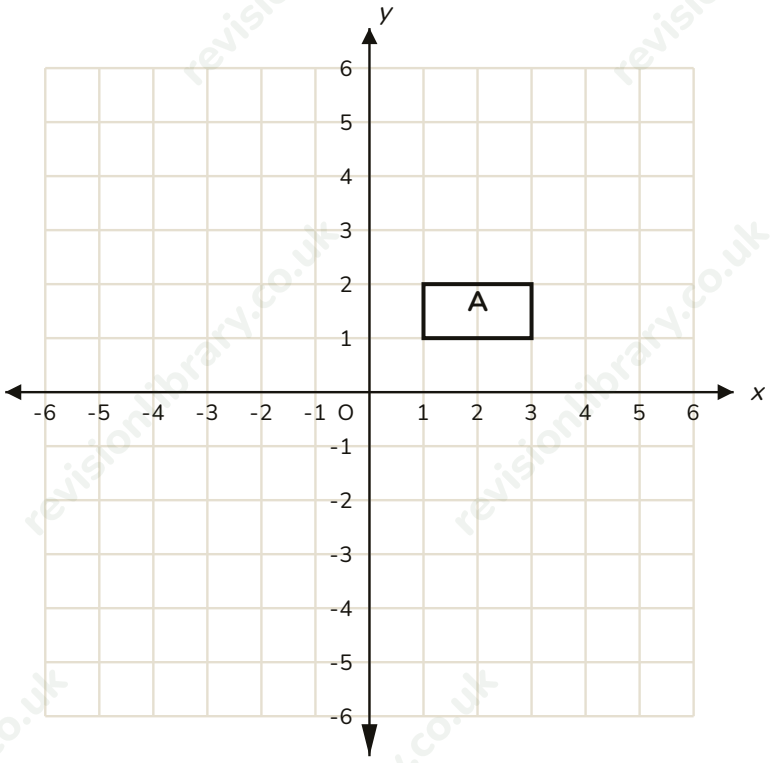
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3 Point A has coordinates (5, -5). Under a translation, A is mapped to A' (0, -10).
Point B has coordinates (1, 3). Work out the coordinates of B' after the same translation, and describe the translation as a column vector in the form (x, y).

(Total for Question 3 is 3 marks)

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4 Shape A has vertices (1, 1), (3, 1), (3, 2) and (1, 2). Shape A is translated by the vector (4, -3) to give shape B.
Find the coordinates of the vertices of shape B.



(Total for Question 4 is 2 marks)

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5 A square has vertices at (1, 1), (4, 1), (4, 4) and (1, 4). Drawn on a grid, the square is translated by the vector (2, 0) to make square S1. S1 is then rotated 180 degrees about the point (3, 3) to make square S2. Work out the coordinates of the vertex that started at (1, 1) after both transformations.

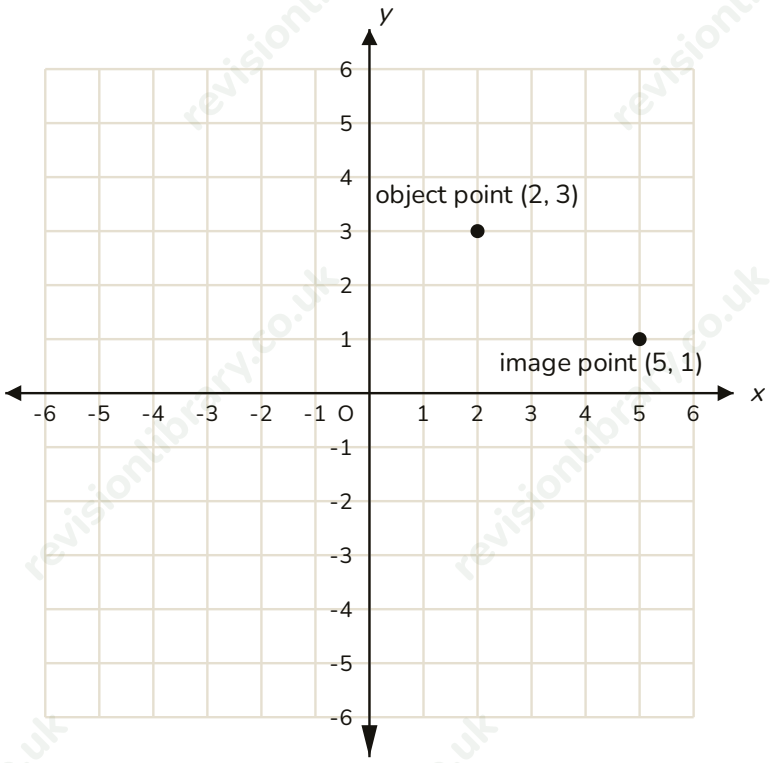
(Total for Question 5 is 5 marks)

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6 Triangle DEF is translated by vector v to triangle D'E'F'. Point D does not move under the translation. If D has coordinates (2, 3), state the translation vector v and explain what this implies about D'E'F'.

(Total for Question 6 is 3 marks)

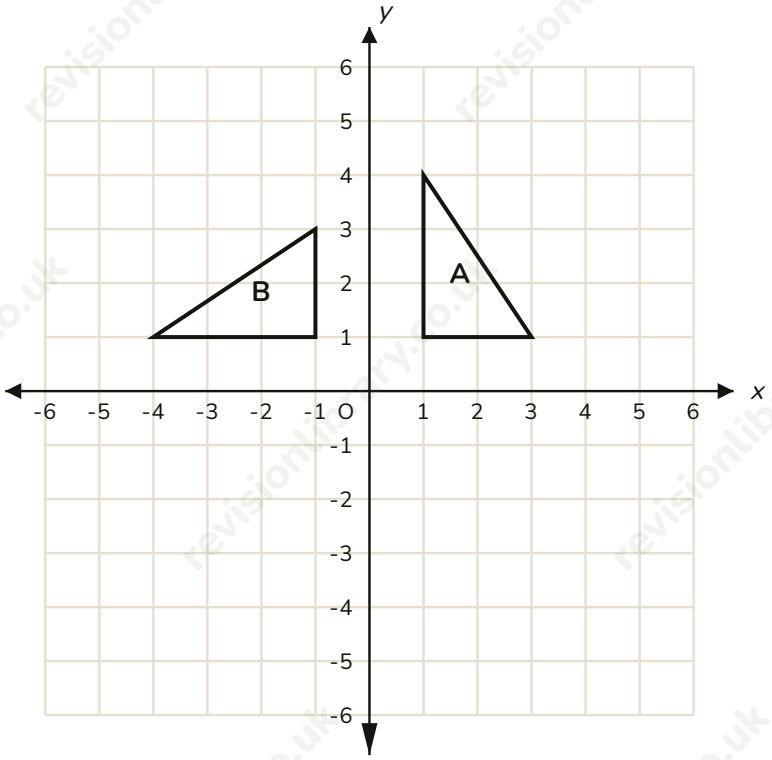
7 A shape is translated so that the point (2, 3) on the object maps to the point (5, 1) on the image. Find the vector that describes this translation.



(Total for Question 7 is 1 mark)

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8 Shape A has vertices (1, 1), (1, 4) and (3, 1). Shape B has vertices (-1, 1), (-4, 1) and (-1, 3). Describe fully the single transformation that maps shape A onto shape B.



(Total for Question 8 is 3 marks)

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Mark scheme · 3.17 Transformations: 30-minute Pack

Question 1

vector from centre to P is (-1, 3)	**M1**
multiplies the vector by 3	**M1**
(-5, 6)	**A1**

Answer: (-5, 6)

Question 2

translation named	**B1**
x-component -5	**B1**
y-component 3	**B1**

Answer: Translation by vector (-5, 3)

Question 3

subtracts coordinates of A from A'	**M1**
vector (-5, -5)	**A1**
B' (-4, -2)	**B1**

Answer: B' (-4, -2); vector (-5, -5)

Question 4

adds 4 to each x-coordinate and subtracts 3 from each y-coordinate oe, at least one correct vertex shown	**M1**
all four vertices correct: (5,-2), (7,-2), (7,-1), (5,-1) cao	**A1**

Answer: (5, -2), (7, -2), (7, -1), (5, -1)

Question 5

translation step: (1,1) + (2,0) = (3,1)	**M1**
state vector or displacement from centre (3,3) to point (3,1): (0, -2) or equivalent subtraction	**M1**
state effect of 180 degree rotation: (x, y) -> ($2*centre_x$ - x, $2*centre_y$ - y) or equivalent	**M1**
apply rotation to get image: (3,1) -> (3,5) shown	**M1**
(3, 5) cao	**A1**

Answer: (3, 5)

Question 6

state vector v = (0, 0) or 'no translation' oe	**B1**
state D' = D or give coordinates D' = (2, 3) cao	**B1**
conclude D'E'F' coincides with DEF (the whole triangle is unchanged) oe	**B1**

Answer: Translation vector v = (0, 0). D' = D = (2, 3), so D'E'F' coincides with DEF (no change).

Question 7

(3, -2) oe, may be written as a column vector	**B1**

Answer: (3, -2)

Question 8

rotation (oe 'rotated')	**B1**
90 degrees anticlockwise (oe 270 degrees clockwise)	**B1**
centre (0, 0)	**B1**

Answer: Rotation of 90 degrees anticlockwise about the origin (0, 0)

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